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FIFTEENTH INTERNATIONAL CONGRESS OF AMERICANISTS.

THE Fifteenth International Congress of Americanists was held at Quebec, September 10 to September 15. While the number of students of early American history and of American ethnology in attendance was not large, the papers presented were of great value, and the local interest in the proceedings was considerable. The congress had an individuality of its own, being attended by many missionaries from all parts of Canada, who contributed to the proceedings reports on the tribes among whom they are laboring; while South America and Central America, which generally occupy by far the greatest parts in the proceedings of the congress, were not so strongly represented.

Delegates to the congress were sent by England, which was represented by Dr. A. C. Haddon and Dr. D. Randall McIver. France sent Professor Léon Lejeal and Comte de Perigny. From Germany, Professor and Mrs. Eduard Seler and Dr. Paul Ehrenreich were present. Mexico was represented by Señor Leopoldo Batres and Señor Santiago Sierra. Unfortunately the representation from the United States was not as good as it should have been. Harvard University and Yale University had sent full delegations, but the number of anthropologists from New York and from Washington was small. No anthropologists from Chicago or from San Francisco were in attendance. The local interest in the congress was well sustained,

and it may be hoped for this reason that the Quebec session may have contributed towards exciting a permanent interest in the subject in Canada. The program embraced in all 91 papers, but only about one half of these were read.

The congress was opened on Monday morning by Sir Louis A. Jetté, Lieutenant-Governor of the Province of Quebec, and was welcomed by representatives of the government and of the city of Quebec. The reading of papers began on Monday afternoon. The first meeting was devoted to the subject of the French in Canada and to historical papers. On this afternoon an important contribution by Abbé Gosselin, communicating unpublished documents relating to the Indians of Louisiana, was presented. Other important communications made during this meeting were by Professor E. L. Stevenson on a Hondius map recently discovered by Father Fischer; by Dr. Berthold Laufer on the history of the introduction of maize into eastern Asia; by M. de Villiers du Terrage on the history of Louisiana; and two papers—one by Mr. Rivard, of Quebec, another by Professor A. F. Chamberlain, of Worcester—on the Canadian French dialect. In the evening Señor Batres reported on his interesting excavations at Teotihuacan, and Father Jones spoke on the location of the Huron villages.

The program of Tuesday morning was devoted to subjects relating to Mexico and Central America. Professor Seler, of Berlin, discussed a number of interesting specimens from the collection Sologuren at Oaxaca, the most remarkable of which is a vase with a design almost identical with those of Peru. Dr. Tozzer, of Cambridge, communicated briefly the results of his interesting studies of the Lacandones of Chiapas, in which he showed that many of the ancient customs of Central America still survive. Dr. George Grant MacCurdy, of New Haven, followed with a discussion of the decorative art in the pottery of Chiriqui. He tried to show that a great many of the decorative motives of the prehistoric tribes of this area may be derived from a representation of the armadillo. Tuesday afternoon opened with additional papers relating to Central America and South America. A number of the excellent paintings from Chichen Itza by Miss A. Breton, Bath, England, were exhibited by Dr. Tozzer, who also gave interesting notes on the Maya language spoken in Yucatan, in which he particularly brought out the occurrence of a true inclusive and exclusive first person in these dialects. Professor Lejeal presented a joint paper by himself and Mr. E. Boman, of Paris, on the Calchaqui question, in which he strongly opposed the stand taken by Professor J. Ambrosetti, who believed he had discovered a relationship between the Calchaqui and the Pueblo Indians of North America. Professor Lejeal proved the close relationship between the Andean culture and that of the Calchaqui. A general review of the distribution and number of South American linguistic stocks was given by Professor Chamberlain. Father Jetté, of Alaska, sent in a brief description of the Tinné tribes of southern Alaska. This paper was supplemented by another one sent by Rev. John Chapman, who treated the Athapascan tribes of Anvik, Alaska. His notes contain a number of interesting Indian texts and a detailed description of the festivals of the tribe. The afternoon closed with a paper by Dr. Dixon on linguistic relationships within the Shasta-Achomawi stock, in which it was shown that a number of languages of northern California, notwithstanding their marked differences, are members of the same stock.

On Wednesday morning the principal papers were by Mrs. C. O. Mason, Miss Natalie Curtis and Miss A. de Cora, in

which practical efforts to keep alive and to revive Indian art were discussed. Miss de Cora described her efforts as art teacher at the Indian school at Carlisle, while Miss Curtis, after some general remarks on Indian music, rendered a number of Indian songs which was a demonstration of the beauties of Indian music. A number of papers by Dr. Dorsey on the Pawnee were read by title. In the afternoon a pleasant reception was tendered to the members of the congress by Lady Jetté.

Thursday morning opened with a discussion by Dr. A. Hrdlicka, of Washington, of those remains of man which are believed to prove his antiquity on this continent. On the whole, his conclusions were negative, in so far as the anatomical differences between these remains and the present types of Indians are concerned. Father Morice read a paper on the position of woman among the Tinné tribes, and Professor Boas communicated a résumé of ethnological problems in Canada. A general review of the principles of government among the Indians of Canada was given by Dr. Roy, of Lévis. A number of papers on the Algonquin tribes of Canada, contributed by a number of missionaries, were read by title. On Thursday afternoon Father Pacifique read a paper on the Micmac, and a description of the religion of the Assiniboine was contributed by Abbé Gauvreau. Dr. Clark Wissler, of New York, read a paper on the diffusion of culture on the Plains of North America. A similar subject was treated in a paper by Professor A. L. Kroeber, of San Francisco, Cal., on the ceremonial organization of the Plains Indians of North America, in which a strong plea for a more detailed study of this interesting subject was made. The peculiar tendency to assimilate the culture of neighboring tribes found among the Tinné was discussed in a paper sent in by Dr. P. E. Goddard, of Berkeley, Cal. Another paper dealing with the question of migration was that by Professor Cyrus Thomas, who discussed the earliest probable movement of tribes of our continent. On Thursday evening Laval University received the Americanists in the gardens of the university.

On Friday morning a series of illustrated papers on Mexico and Central America were read. The principal among these were those contributed by Professor Seler, who discussed parallels in Mayan manuscripts, the monuments of Huilocintla, and who also contributed comparative studies on the ruins of Yucatan. Dr. Seler also presented brief abstracts of a paper by Dr. K. Sapper, of Tübingen, on the present distribution of the Choles and Chorties, and of another by Dr. W. Lehmann, of Berlin, on ancient Mexican mosaics in the Ethnographical Museum of Berlin. Dr. Peabody made some remarks on the manuscript contributed by Dr. George F. Kunz, discussing some features of the Bishop collection of jade. The morning session ended with a paper by Dr. Walter Hough, of Washington, on the ancient population of the Gila Salt River. On Friday afternoon Abbé Forbes presented an interesting study of the proper names of the Iroquois, and Abbé Rousseau discussed the question of Hochelaga. Dr. D. E. Dionne, of Quebec, spoke on the translations of the Lord's Prayer into Indian languages, and Professor Boas gave a sketch of the grammar of the Ponca. A number of important papers were presented by title, owing to the absence of the authors. Among these, a description by James Mooney of the Cheyenne Indians, and a presentation of Cheyenne grammar by Rev. R. Petter, deserve special mention. In the evening the members of the congress were conveyed by special train to Montmorency Falls, where the city of Quebec tendered them a reception.

The program of Saturday contained only

a few papers, one a discussion by Dr. Walter Hough of two great culture-plants of America, the palm and the agave. Further, the desirability of a uniform phonetic alphabet was discussed in a paper sent in by Mr. Jules Geddes, and another by Mr. J. N. B. Hewitt, which were discussed by Father Morice. At the following business meeting Vienna was chosen as the place of meeting of the next congress, which is to take place in 1908. After the business meeting the congress was closed by the president, Dr. Robert Bell, of Ottawa.

The success of the meeting at Quebec, and its peculiar character, were due particularly to the efforts of Monsignor J. C. K. Laflamme and of Dr. D. E. Dionne, the secretary-general. After the close of the congress, a number of excursions were made, which continued until Monday, the seventeenth.

A number of publications were presented to the congress by various organizations. The government of Quebec presented two books on the geographical names of Quebec, one by Dr. Roy, the other by Dr. Rouillard. The government of Mexico presented a special publication on the excavations at Teotihuacan, and three other contributions from the Department of the Inspection and Preservation of Archeological Monuments, all prepared by Mr. Batres. The University of California sent the important papers by Professors Putnam and Merriam on cave explorations in California. The government of Ontario sent copies of its archeological report, which contains a general summary of Canadian ethnology, prepared by a number of contributors. The University of Pennsylvania dedicated to the congress the first part of the second volume of the *Transactions* of the Department of Archeology, containing articles on the decorative art of Crete, by Edith H. Hall; notes on Xochicalco, by Miss Breton; notes on the Western Eskimo, by Dr. Gordon; and notes on an engraved bone from Ohio, also by Dr. Gordon. Mr. Charles P. Bowditch presented to the congress a paper relating to his Maya studies. The American Anthropological Association presented a useful summary of anthropological activities in the United States since the meeting of the congress in New York in 1902. A special number prepared by the publishers of *Globus* unfortunately did not reach Quebec in time. The Society of Americanists of Paris presented a set of its publications to the congress, and copies of the last number of its publications to all the members of the congress. Mr. Teobert Maler sent a valuable set of blue-prints of his plans and drawings.

THE AMERICAN MATHEMATICAL SOCIETY.

The thirteenth summer meeting and fifth colloquium of the society were held at Yale University, extending through the week September 3–8. Monday and Tuesday were devoted to the presentation of the thirty-four papers on the program of the regular meeting. President W. F. Osgood and ex-President E. H. Moore occupied the chair. Forty-six members were in attendance. The following new members were elected: William Beebe, Yale University; J. B. Clarke, San Francisco Polytechnic High School; E. C. Colpitts, Cornell University; Brother Constantius, St. Louis Christian Brothers College; G. W. Droke, University of Arkansas; R. M. Ginnings, State Normal School, Kirksville, Mo.; Harriet E. Glazier, Western College for Women; C. O. Gunther, Stevens Institute; W. G. Hurwitz, University of Missouri; G. O. James, Washington University; B. F. Johnson, State Normal School, Cape Girardeau, Mo.; E. B. Morrow, Princeton University; G. B. Obear, Brown University; F. M. Pedersen, New York City College; G. A. Rose, Hardin College; R. L.

Short, Chicago, Ill.; Betty Trier, Mount Holyoke College; J. W. Withers, St. Louis Teachers College. Thirteen applications for membership were received. The total membership of the society is now about 540.

A committee consisting of Professors Bôcher, Van Vleck and Townsend was appointed to report to the council at the October meeting a list of nominations of officers to be elected at the annual meeting in December. Steps were also taken toward amending the constitution to include the editorial committee of the *Transactions* in the membership of the council, and toward increasing the sale of the Chicago Mathematical Papers and the Boston Colloquium Lectures published by the society.

One of the most valuable of the society's institutions, and one as regards which it stands alone among similar organizations, is the colloquium, or course of lectures on recent important advances in the science given at intervals of two or three years by specialists in the fields covered. The fifth of the series opened on Wednesday morning and extended to Saturday noon. Three courses were given, as follows: By Professor E. H. Moore, five lectures 'On the theory of bilinear functional operations'; by Professor E. J. Wilczynski, four lectures on 'Projective differential geometry'; by Professor Max Mason, four lectures on 'Selected topics in the theory of boundary value problems of differential equations.' Forty-three persons attended these courses.

On Tuesday afternoon the visitors were conducted through the grounds and buildings of the university. Thursday afternoon and evening were devoted to an excursion to the shore of Long Island Sound. Throughout the meeting, the Graduates Club was the center for large and small gatherings. The hospitality of the university and its officers was gratefully acknowledged by appropriate resolutions and will long be remembered by all who were present at the meeting.

The following papers were read at the summer meeting.

A. R. SCHWEITZER: 'Systems of axioms for projective geometry.'

A. R. SCHWEITZER: 'Concerning abstract geometrical relations.'

O. D. KELLOGG: 'The behavior on the boundary of harmonic functions of a region.'

F. R. SHARPE: 'The motion of a viscous gas.'

R. D. CARMICHAEL: 'Multiply perfect numbers of three different primes.'

LUDWIG STICKELBERGER: 'Zur Theorie der vollständig reduciblen Gruppen die zu einer Gruppe linearer homogener Substitionen gehören.'

W. B. FITE: 'Irreducible linear homogeneous groups whose orders are powers of a prime.'

ARTHUR RANUM: 'The group of classes of congruent matrices and its application to the group of isomorphisms of any abelian group.'

R. G. D. RICHARDSON: 'On the reduction of multiple integrals.'

G. D. BIRKHOFF: 'On a certain class of sets of normed orthogonal functions.'

W. B. CARVER: 'Associated configurations of the Cayley-Veronese class.'

L. E. DICKSON: 'On commutative linear algebras in which division is always uniquely possible.'

L. E. DICKSON: 'Uniform definitions of the abstract forms of the various known systems of linear groups.'

L. E. DICKSON: 'Criteria for the irreducibility of functions in a finite field.'

L. E. DICKSON: 'On the theory of equations in a modular field.'

JAMES MCMAHON: 'The differential geometry of the general vector field.'

W. A. MANNING: 'A note on transitive groups.'

C. H. SISAM: 'On systems of conics lying on surfaces of the third, fourth and fifth orders.'

VIRGIL SNYDER: 'Plane quintic curves which possess a group of linear transformations.'

MAX MASON: 'The expansion of an arbitrary function in terms of normal functions.'

MAX MASON: 'The boundary value problems of differential equations of hyperbolic type.'

EDWARD KASNER: 'The inverse problem of dynamics.'

EDWARD KASNER: 'The geometry of dynamical trajectories.'

J. W. YOUNG: 'General theory of approxima-

tion by functions with a given number of parameters.'

J. I. HUTCHINSON: 'On loci the coordinates of whose points are abelian functions of three parameters.'

L. P. EISENHART: 'Applicable surfaces with asymptotic lines of one surface corresponding to a conjugate system of another.'

H. B. LEONARD: 'On the factoring of composite hypercomplex number systems.'

FRANK MORLEY: 'Reflexive geometry.'

G. A. MILLER: 'Generalization of the groups of genus zero.'

E. B. WILSON: 'On divergence and curl.'

E. B. WILSON: 'Oblique reflections and unimodular strains.'

E. B. WILSON: 'Double products and strains in n dimensions.'

F. R. MOULTON: 'A class of three dimensional periodic orbits in the problem of three bodies, with applications to the lunar theory.'

OSKAR BOLZA: 'Weierstrass's theorem and Kneser's theorem on transversals for the most general case of an extremum of a simple definite integral.'

The next meeting of the society will be held at Columbia University on Saturday, October 27. The San Francisco Section met at the University of California on Saturday, September 29.

F. N. COLE,
Secretary.

THE EDINBURGH MUSEUM.

THE Edinburgh museum challenges attention. It is significantly *useful,* and seems to attempt to make its collections supplementary to class-room study; nor is there any hesitancy shown in displaying specimens to the limits of its capacity, as long as they contribute in the slightest degree to the need of the student. Its methods of installation are not expensive or elaborate, but they show painstaking care, considerable ingenuity and promise to be made progressively better and more complete.

There can be no question as to the richness of its possessions in geology and lithology and Scottish mineralogy, nor is there reason to look askance upon their splendid biological demonstrations. The writer enjoyed the opportunity of only one or two visits to its crowded halls, and then confined his attention to the departments of natural history, which are in it associated with very satisfactory, in some instances most valuable, collections, illustrating machinery, fictile art, ceramics, design, ethnology, sculpture, architecture, industries, chemistry, navigation, archeology and house furnishings.

There are evidences in many places of unfinished plans, of reorganization and experiment, but the museum indubitably claims the attention, and admiration, in some ways, of every museum promoter and officer, and its own relations to the inquisitive Scotch public are wholesome and helpful.

Criticism in some particulars might naturally be provoked as where in one hall or room, mammals, birds, insects, crustaceans, fish, shells, echinoids and hydrozoans are grouped together, and in another invertebrate fossils and birds, while in a third there are discovered birds, invertebrate fossils and corals. This peculiar juxtaposition is doubtless referable to want of space, capacious as the museum is, and not in all instances to the aims of comparative study.

The museum is on Chamber Street between South and George Bridge Streets, beyond St. Giles cathedral, not far from the university, and opposite the Watt College. It consists of a long (250 feet) three-storied skylighted oblong section with terminal buildings disposed at right angles to the axis of the main structure, and similarly arranged in three stories with skylights, except that their anterior portions are also illuminated by the introduction of wall windows. Back of the main series of halls or galleries, as they might be called, are three large rectangular

halls with basement floor, and galleries, also deriving their illumination from above. The lighting generally is most serviceable, for, by reason of the immense skylight space, of absolutely clear glass, the narrowness of the galleries, and the height of the ceilings, no hopelessly heavy shadows are cast; and, at least when the writer was there, on a brilliant day, the light was superabundant. As a matter of fact, white shades covered the skylights and helped advantageously to diffuse and diminish the light. Reflections in the flat cases around the balustrades of the central opening, on the galleries, were noticeable, and of course annoying, but could be quickly dissipated by holding a hat above them.

One of the striking features in the natural history exhibit is the elaborate art expended upon dissected animals, the explanation of their parts and the beauty and thoroughness of many of the preparations. Zoantharia, sea urchins, star-fish, insects, crustaceans, worms, fish, are thus accurately dissected, their organs named, helpful addenda of elucidations and suggestions appended, all clearly printed, and assisted by drawings, frequently colored. These preparations, as with many of the insects and crustacea, and spiders are mounted dry, and others are in alcohol in flat jars, the object being quite usually on blue glass with red threads connecting each part with its printed *name,* which latter appears on the plate or board, which holds the specimen. The dissections of the thornback ray, the torpedo, the dog-fish, the skate, with developing young are superb. The amphibia are similarly treated, and near them is noticed a splendid exhibit of the osteology of the cod. Further on in this section are some absolutely unimpeachable examples of the phases of bird feathering, and the tract-distribution of feathers illustrating pterylography. Amongst these is a very succinct and forcible demonstration of the terminology of the feathers of the ring dove.

Throughout this section the exceeding cleverness and technical power of Mr. W. Eagle Clarke, and Mr. P. H. Grimshaw are in evidence. Many, and most of the difficult subjects, are their personal handiwork, always, I believe, submitted to the approval of Dr. Traquair, the director of the museum, who is now about to retire.

The mollusca are also ecologically discussed in diagrams, selected specimens and dissections. There are important groups of specimens illustrating types of shells, their external and internal features, old and young conditions, terminology of parts, the muscular impressions, in the shells clearly delineated by red painting, also hinges and teeth, the nature of the margins of the valves, pedal, siphonal and byssal openings, position of umbones, terminology of the multivalvular forms; forms of shell, as dextral, sinistral, elongate, subulate, tubular, cylindrical, ovate, globose, turbinate, involute, conical, cordate, etc.; the ornamentation, as granulate, pustulate, subnodose, reticulate cancellate, spinose, clathrate, costate; colors; variations of sculpture as so well shown in *Pecten glaber, Liguus virginia, Helix nemoralis;* protection as in *Xenophora conchyliophorus* (with its attached shells); and the varying aspects of the periostracum.

The examples under the above heads are mounted on gray cards with black centers, explained by clear clean printed labels. In the molluscan biology excellent preparations most graphically instruct the visitor in the anatomy of the common shells, and some, as those of the cephalopods, merit pronounced praise. The morphological and embryological study is continued in this hall throughout the animal kingdom.

The specimens of fossils from Cambrian

to Pleistocene are superior, though they seem to lack effectiveness from their irregular distribution in various halls; thus in the hall of fossil fish there is a fine collection of living fishes, sponges and *graptolites*. Many of the invertebrate fossils are grouped with the living shells, not of course at all confusedly, but in the same hall in wall cases. Noticeable in one group is an interesting collection of fossil footprints from the new Red Sandstone of Corncockle Muir, Dumfriesshire, formed by the late Sir Wm. Gardine, Bart, and containing the specimens described and figured by him in his 'Ichnology of Annandale.'

The Devonian fossil fish easily take precedence amongst the fossil collections, and they possess an unmistakable distinction. They make up a wonderful collection. Here are the Devonian genera, *Asterolepis, Bothriolepis, Cephalaspis, Coccosteus, Cyroptychius, Diplopterus, Dipterus, Drepanaspis, Eusthenopteron, Holoptychius* —a superb slab, three feet long, shows a group of one species of this genus—*Glyptolepis, Homosteus, Osteolepis, Phaneropluron, Pteraspis, Pterichthys, Thrusius, Tristichopterus.* The carboniferous Jurassic and Tertiary fishes are also of unusual value.

Amongst the fossil invertebrates attention may be justly called to the collection of specimens in the Carboniferous (especially instructive cephalopoda) and Jurassic sections, the interesting *hippuritidæ*, of the chalk, and one splendid example of *Requienia* (*R. ammonia*, Goldfuss) from the Meocomian of France. The Jurassic and Triassic Cephalopoda are superior in individual excellence, though the collection does not seem very large. The polished Triassic Ammonoidea are certainly handsome. The Paleozoic fossils are naturally of great interest, but incomparably poorer in quality and numbers than the exhibition of similar material from the same horizons in New York.

The fossils are mounted on buff boards with printed divisions, printed and written labels, and are somewhat incongruously associated with a collection of comparative craniology in the glass-fronted cases beneath them. In this same room is a collection of shells, evidently intended for comparative or morphological study, as it is far from being very extensive in numbers or in species. Models of *Arion* and *Limax* were noticed and apparently a cleverly mounted skin of *L. agrestis*, L. The fossil and living crustacea in this hall, in wall cases, were excellent, and the *Eurypterida* decidedly valuable.

A very excellent instance of an industrial exhibit may be profitably quoted as suggestive at least to curators contemplating similar objects. It is the care devoted to an instruction in the making of Wedgewood ware. Here under raw materials are placed boulder flint, gravesend flint, calcined flint, limestone, chertstone, compact gypsum, flint dried and ground to a firm mass as used in the glazes, raw Swedish feldspar, Swedish feldspar fired in the biscuit oven, gray marl, seggar clay, a mixture of gray, black and red marls passed through a couple of rollers, blue ball or poole clay. Blue clay fired in the biscuit oven, black clay, another kind of ball clay, china clay, Cornish clay or kaolin (a fine white clay obtained from the decomposed feldspar which is washed out of certain Cornish granites), china clay with sand washed out, china clay fired in the biscuit oven, native china clay before being washed, hard Cornish stone fired in the highest heat of the biscuit oven, china clay fired in the highest heat of the biscuit oven, blue clay fired in the highest heat of the biscuit oven, black clay, gray marl, red marl, all fired in the biscuit oven, calcined flint broken or stamped, flint knockings—

the pieces discolored by oxide of iron picked out as waste, American feldspar calcined in the glass oven, calcined feldspar ground and ready for use in Parian, soft Cornish stone (slightly decomposed, most decomposed, etc.), hard and soft Cornish stone fired in the biscuit oven, hard and soft Cornish stone ground and mixed, as used for the body and glaze of ware, pigments, glazes, slips, frits, chemicals (about ninety glass bottles enclose these ingredients), and the various stages of the ware with implements, in a superb and very precious exhibit of vessels, vases and plaques, partly chronological.

The archeological and ethnological exhibits are of great merit and value. A small group of objects labeled 'chemical balance and other apparatus used by Professor Joseph Black' will attract the reverent attention of chemists.

The general mineralogical collection is an excellent and adequate representation of the mineral retinue of species from the native elements to the hydrocarbons, though it is quite lacking in distinction or phenomenal beauty. It is well arranged, for purposes of study, in flat cases around the central opening under the skylight, and in flat cases about the walls, with larger specimens above and below the latter. There is noticeable in it good spodumene from Norwich, Conn., and hiddenite from North Carolina, a remarkable pink topaz from the Ural Mountains, three crystals of euclase, some striking scolecite from Iceland, excellent torbernite, superior barite crystals, a handsome halite group, an attractive exhibit of hydrocarbons, and a small complementary collection of pseudomorphs—of much interest—amongst which the pseudomorph of vesuvianite after garnet deserves mention. A beautiful crystallized gold specimen from Ballarat, weighing six and three fourth ounces, a large platinum nugget, good atacamite, crystals, corundum, bournonite, green fluors, apophyllite from India, and the handsome ruled agates from the Faroe Islands are also memorable.

In lithology the constituents of rocks are shown, their combination in rock structure and examples of characteristic rocks, as acid, subacid, basic, metabasic, etc.; while structure and phase receive illustration under metamorphism, shearing, crumpling, foliation, lamination, ripple-marks, etc. Many crystallographic drawings appear throughout, and labels are sometimes very elaborate, as take, for instance, this one under pseudomorphism:

Mould-Formation, with Removal of Pattern Quartz Coating Galena.—There has, in this specimen, been two successive depositions of Galena, with investiture of quartz. After the removal of the first formed crystals of galena, a second and larger set of crystals of galena has been laid down upon the first formed layer of quartz. These in turn have been invested by a layer of quartz, and thereafter have been themselves removed; Leadhills, Scotland.

The climax of excellence in the museum, in the opinion of the writer, is reached in the hall devoted to Scottish geology. The exhibit here of rocks and minerals is remarkably effective, and in its lithological aspects quite extraordinary. Here are gathered together the minerals of Scotland, views of its geological scenery, with a display of rock specimens, luminously referred to position by maps, marked with pins and numbers, correlated exactly with the specimens of rocks near them. There are also relief maps dissected, colored and explained, and on the walls the fossils of Scotland with a long series of prehistoric flints, while upright A-shaped cases engage immediate notice from interesting and handsome specimens of geological structure, mineral masses and lithological phases contained in them. This hall contains a wealth of Scottish mineral treasures, and will reward the student by a

comprehensive showing of Scotland's geological history and mutations.

Among its extraordinary features he will be attracted to the Heddle collection of cut and polished agates with their labeled parts and exposition. It is well known that Dr. Heddle took a very particular interest in the genesis of agates and related mineral phenomena, and the little leaflet which may be purchased at the door of the museum to-day may be regarded as a complete expression of his opinions—convictions in this matter he conscientiously repudiated—on the subject. It has been prepared by Mr. J. G. Goodchild. The extensive display of cut agates will surprise visitors and seems, perhaps, rather needlessly elaborated. But these small nodules, cut across their longest diameter and polished, are very attractive, and the short attached printed labels reveal differences in structure and composition which are very interesting. It is impossible to even epitomize Dr. Heddle's views on this subject in this article, but it may interest readers to learn that the late Dr. Heddle, of St. Andrews, formed a very large collection of agates, gathered from all parts of Scotland, principally with the view of obtaining definite information as to the developmental history of these forms of silica. This collection, on the death of Dr. Heddle, passed into the hands of Mr. Alex. Thoms, of St. Andrews, who, already a generous donor to the Scottish mineral collection, in 1898 presented to the museum 1,000 of Dr. Heddle's agates, all of them selected and typical examples. It is these specimens which are now carefully exhibited in their surprising variety in the hall of the Edinburgh Museum, enclosing its examples of Scottish geology.

The Edinburgh Museum is a plain and, probably, inadequately equipped museum; it is neither ostentatious nor unimportant, it contains a great accumulation of material, and this brief notice may draw attention to it, amongst the numerous visitors to the Athens of the north. Such sketches of museums, imperfect and fragmentary as they may be, cumulatively help to increase the interest taken in museums by the lay and professional member.

L. P. Gratacap.

ISRAEL COOK RUSSELL.

The senate of the University of Michigan has adopted the following memorial as offered by the committee, Professors Lombard and D'Ooge:

Again and for the third time within the short space of two months, the hand of death has been laid heavily upon us, and we are called to mourn the loss of another honored and beloved colleague.

Professor Israel Cook Russell entered upon his duties as professor of geology in this university in the autumn of 1892, and was stricken down in the midst of his work by an illness which after a few day terminated his life, on May 1, 1906. He was born near Garratsville, N. Y., December 10, 1852, son of Barnabas and Louisa Sherman (Cook) Russell. His ancestors were early settlers in New England. He was fitted for college at the Rural High School, Clinton, N. Y., and Hasbrook Institute, Jersey City. He entered the University of the City of New York in 1869, and was graduated bachelor of science and civil engineer in 1872. After pursuing graduate studies at the Columbia School of Mines, he was given the degree, master of science, by the University of New York in 1875. In 1874 he went to New Zealand as a member of the United States Transit of Venus Expedition, and in this connection made a journey round the world. On his return home in 1875 he was appointed assistant professor of geology in the Co-

lumbia School of Mines, where he remained two years. In 1878 he became assistant geologist on the United States Geological Survey west of the 100th meridian, and devoted one season to field work in Colorado and New Mexico. The following year was spent in European travel. In 1880 he was appointed assistant geologist on the United States Geological Survey. It was not long before his merit was recognized and he was promoted to geologist of the survey, a position which he held throughout the rest of his life.

Professor Russell was more than geologist and geographer, he was an ardent student of physiography. In his preface to 'Rivers of North America' he wrote:

> When investigators of surface geology and geography made their bold explorations into the vast arid region of the southwest, they discovered a land of wonders, where the mask of vegetation which conceals so many countries is absent and the features of the naked land are fully revealed beneath a cloudless sky. It was in this arid region of strong relief that a revival of interest in the surface forms of the earth was engendered. The seeds of what is practically a new science—physiography—gathered in this land by J. S. Newberry, J. W. Powell, G. K. Gilbert, C. S. Dutton and others, when carried to other regions, bore abundant fruit.

Russell belonged to this new school. He studied the surface of the earth as it exists to-day, as a book where one can read not only the past history of the world, but prophecies as to its future destiny. It was the forces which nature uses to mould the world that chiefly interested him, and throughout his books one sees him tracing the transformations of the earth under the influence of ice and water, and the cooling of the earth's crust.

It was his desire to study the forces of nature where they are most clearly revealed that led him to endure the hardships of the mountains and the deserts of the west. In order to visit these regions he attached himself to the United States Geological Survey, and while he did the work of the government, he gathered the rich harvest of scientific data which he gave to the world in his many publications. But he was interested not alone in the processes which are wearing away and building up the surface of the earth; the conditions which exist to-day, and how they may be utilized for the good of mankind, were carefully observed. This is evidenced by his thoughtful study of the water supply of the arid regions of the west, and his conscientious work on the water supply of our own community. Ann Arbor owes him a debt of gratitude for the earnest attention and large amount of time which he so freely gave for the benefit of his fellow-citizens.

Many of his expeditions were of the nature of a reconnaissance of the surface geology of regions which had never been traveled by any trained observer. In 1889 he was sent by the United States Geological Survey on an expedition up the Yukon and Porcupine rivers, Alaska, a journey of about twenty-five hundred miles through an almost unknown wilderness. In 1890 and 1891 he conducted two important explorations in the region about Mount St. Elias, under the joint auspices of the United States Geological Survey and the National Geographical Society, during which special attention was given to the study of glaciers and to geographical explorations.

It is hard to think of the quiet, modest, somewhat frail-looking man, our colleague and friend, as the celebrated 'pioneer explorer' of the wilds of Alaska. Yet all who have accompanied him on his expeditions bear witness to his boundless energy and tenacity of purpose, his strength and endurance, and his resourcefulness in

grappling with the difficulties with which nature guards the secrets of her fastnesses.

During his connection with the University of Michigan, he carried on extensive explorations for the United States Geological Survey in many of the western states, and for the past five years of his work for the survey has given especial attention to the question of the water supply and irrigation of those vast areas, which need only water to be converted into fruitful fields. In these expeditions he explored northwestern Nevada, the Mono Valley of California, central Washington, the Cascade Mountains of northern Washington, southern Idaho, the south and southeastern part of Oregon, central Oregon, Nez Percees County of Idaho, and the Snake River Valley of Idaho.

Eighteen of the annual reports of the United States Geological Survey contain papers by him, these papers covering more than fifteen hundred pages, and being richly illustrated by photographs, maps and diagrams, picturing the topography of the country through which he traveled. The 'Geologic History of Lake Lahontan, a Quaternary Lake of Northwestern Nevada,' is a monograph of nearly three hundred pages, and his paper 'The Newark System' is a still more extensive monograph.

Glaciers had for him, as for every true mountain climber, a fascination. In 1883 he wrote a fifty-page paper on the 'Existing Glaciers of the United States.' It was in 1890 and 1891 that he made two expeditions to Mount St. Elias, where he nearly lost his life, first attempting to land on the wild coast of Alaska, and, later, on the mountain itself.

Professor Russell, in writing of the first expedition, says: 'The country visited proved of such great interest both to geologists and geographers that it was decided to review the study of the various problems it offered during the following year.'' The way in which he carried through the second expedition is perhaps as good evidence as we have of the character of the man. The decision to send the expedition was not reached until May 17. That night Russell left Washington for Seattle. On arriving there he found that the revenue cutter *Bear* would leave for Alaska May 23. This gave him a week, but in that time he engaged his men and secured all the instruments, camp equipment and provisions needed for a prolonged stay in the wilds. He went without any trained assistants, only taking six camp hands, three of whom fortunately had been with him the year before. As the land was approached, Mount St. Elias could be seen one hundred and fifty miles away. The sea was calm, but the huge rollers of the Pacific were breaking on that rugged coast, which made landing exceedingly dangerous. In the successive attempts to land the outfit, the boats were repeatedly capsized, and a lieutenant, four sailors and one of the men of the expedition were lost. A delay necessarily resulted, and this delay prevented Professor Russell from reaching the top of the mountain. There is only a short interval when the mountain is free from snow-storms, and he was caught in the first storm of the year. Most of us know the story of how, when within striking distance of the top, he found that his men had failed to bring certain instruments and how he sent them back to the base camp, remaining alone on the glacier. Then came the snow. He saved himself by digging a hut in the side of a drift and there he stayed for three days, until the storm cleared. He has said that he could have reached the top of the mountain, but that he knew if he did he would never return; so he was forced to retrace his steps. The knowledge

which he gained of the mountain in these two expeditions he freely imparted to Prince Louis of Savoie, Duke of Abruzzi, and thus ensured the success of the Italian expedition. The reports of his expeditions to Mount St. Elias are found in a paper printed in the *National Geographic Magazine*, and in the reports of the United States Geological Survey. In these papers the glaciers of Mount St. Elias are described, and he has written at least ten other papers on glaciers of North America and on glacial action, besides his well-known book on these subjects.

Professor Russell became an authority not only on glaciers and the effects of ice and water upon the configuration of the earth, but an authority also on the forces which are the cause of earthquakes and volcanic action. When the Island of Martinique and St. Vincent were visited by the terrible eruptions of Mt. Pelée and La Soufrière in 1902, he was asked by the National Geographical Society to go to the islands and observe the phenomena. In addition to his report to the society, and his book on volcanoes, he is the author of ten or more papers on volcanic phenomena and their results.

During the summers of 1904 and 1905, Professor Russell worked for the Michigan State Survey in the southern part of the northern peninsula of Michigan. The report of the work of 1904 has been published, but that of 1905, although finished, is still unprinted. It is entitled 'Surface Geology of Menominee, Dickinson and Iron Counties of Michigan.'

Another paper on the geology of Michigan, entitled 'On the Drumlin Area of Northern Michigan,' was read convocation week, 1905, before the Geological Society of America at Ottawa. It was at that meeting that Professor Russell was chosen president of the society. We are all familiar with his work on the water supply of Ann Arbor, the report of which was published by the city council, 1905.

There remain three unpublished papers to be mentioned. One of these is the folio to accompany the map of the United States Survey of the Ann Arbor Quadrangle. This deals with the marl deposits and the hard rocks of the region. Another is the paper on 'Ideals Concerning Municipal Water Supplies,' which he read at the meeting of the Michigan Academy of Science, March, 1906, and which will appear in the reports of the academy. And finally there is a paper of 12,500 words in typewritten form, which he probably intended to use after revision as his presidential address at the next meeting of the Geological Society of America. It is entitled 'Concentration as a Geologic Principle.' In addition to these there remains a large amount of manuscript on the volcanoes of Martinique and St. Vincent, apparently designed to be used in book form.

In addition to his many scientific reports, papers and monographs, represented by more than one hundred titles, he published five books: 'Lakes of North America,' 1895; 'Glaciers of North America,' 1897; 'Volcanoes of North America,' 1897; 'Rivers of North America,' 1898; 'North America,' 1904.

His first book, aside from the monographs which have been mentioned, was not written until he had passed fifteen summers in the field, studying nature face to face. His books, therefore, embody the mature judgment of a man who through long years of work in the laboratory of the geologist had become a trained observer, and acquired a personal knowledge of the facts of which he was to treat. A naturally keen insight into physical problems had been strengthened by his early training, and he was able to study the earth as

one would examine a vast machine, and to check the speculations suggested by his fancy, by sound common sense and good judgment. The modesty which was so characteristic shows itself everywhere in the tone of his writings, at the same time that his self-reliance and the earnestness of his convictions led him to express himself with definiteness, and to impress his readers with the justness of his conclusions. His writings are widely known and frequently quoted abroad as well as in this country. They are wonderfully even; they are all good; and it is hard to assign to any one of them a special preeminence.

In 1886, he visited the Mono Valley region of California, and made a preliminary examination of its geology for the United States Geological Survey. In his library there is a reprint of his report of this expedition—'Quaternary History of the Mono Valley, California'—and on the reprint there is the word 'incomplete' in his handwriting. The Mono Valley region is a charming mountainous country, to the south of the Yellowstone Park, resembling Switzerland except for the lack of snow on the mountains. The country is now being rapidly opened up, and the enthusiastic alpine climbers there are anxious that it should be explored and made known to tourists. The first report of Professor Russell was so excellent that he was to have been sent by the survey this summer to complete the work which he began so well twenty years ago.

The best evidence of the success of a scientific man is to be found in the esteem shown him by men of his own branch of science. This Professor Russell possessed to a high degree, and evidence of their recognition of his ability is to be found in the honors which they paid him.

He was a fellow of the Geological Society of America, and was elected its president for 1906; a fellow of the American Association for the Advancement of Science, and vice-president in 1904; a fellow of the National Geographical Society, and a member of its board of directors (twice this society sent him on important expeditions); a member of the Michigan Academy of Science, and its president in 1902; a member of the Congrès Géologique Internationale; and of the American Alpine Club, of which he was one of the directors. He was honorary member of the Appalachian Mountain Club, and corresponding member of the Geographical Society of Philadelphia, and of the Scottish Geographical Society. He was chairman of the section of geography and a speaker in the section of physiography at the Congress of Arts and Science, held in St. Louis in 1904. He received the degree of doctor of laws from the University of New York, his alma mater, in 1897. He was generally recognized as among the foremost of the geologists of the country, and had just received an advantageous call to a prominent university. The University of Michigan has been most fortunate to have been able to have had his valuable services for so long, and has met with an irreparable loss.

He was a scientist of international renown, whose writings and explorations were constantly increasing the reputation of this university. He was a scholar of high ideals, whose interest in research work was great, and whose example as a devoted student and tireless worker made itself felt in all our circles. He was a teacher who made his students feel the importance of scientific methods and true knowledge. He was a high-minded, modest, true gentleman, who made himself beloved by all who learned to know him, and most by those who knew him best. His kindly manner, his sense of humor, his playful wit, dry

and droll, but never caustic, and his chivalrous spirit, will always linger in our memory.

We desire to tender to the bereaved family of our lamented colleague our profound sympathy, and we order spread upon the records of the senate this minute, in remembrance of our appreciation of his work and life among us.

WARREN P. LOMBARD,
MARTIN L. D'OOGE,
Committee.

May 7, 1906.

SCIENTIFIC BOOKS.

Les Révélations de l'écriture d'après un controle scientifique. ALFRED BINET, Docteur ès Sciences, Directeur du laboratoire de psychologie physiologique. Librairies Félix Alcan et Guillaumin réunies. Paris, 108 Boulevard St. Germain. 8vo. Preface. March 24, 1906.

Dr. Binet continues his excellent work, beginning with the 'Philosophie du raisonnement' and 'Recherches experimentales par l'hypnotisme' (1886), which preceded 'Animal Magnetism' (1888), 'Psychic Life of Micro-organisms' (1889), and 'Les altérations de la personalité' (1892); by commencing a new series of studies of certain fetishes which have become rooted in the beliefs of a large number of people.

These are graphology, phrenology and chiromancy. A study of such subjects by a master is of the greatest value to the world, and hence a considerable space is given to the review of the first on the list in order that the reader may judge of both methods and conclusions.

The book of 257 pages is a résumé of a series of tests applied by the author to 'Graphologists' as well as lay experimenters (the latter of all ages and degrees of intelligence) as to their ability to determine the sex (first part, 4 chapters, 21 pages), the age (second part, 5 chapters, 15 pages); the intelligence (third part, 11 chapters, 124 pages); and the character (fourth part, 7 chapters, 77 pages); of a writer by his or her chirography.

Part I.: By what marks can sex be determined in writing?

Dr. Binet proceeds on the ground that if those professing to be graphologists can determine the sex from writing in more than 50 per cent. of cases it raises their ability above that of pure chance, which (*in a large series*) is just 50 per cent.

To avoid suggestion he decided to use the addresses on envelopes. Even here the percentage of error of his experts rises materially when the addresses are from a person of one sex to one of another. The two experts were M. Crépieux-Jamin, of Rouen, and M. Eloy, of Paris.

Amusing experiments to ascertain how much more reliable were professional graphologists than 'ignorants' (those ignorant of the so-called art of 'graphology') resulted as follows. In 180 addresses M. Crépieux-Jamin, by far the most skillful graphologist, was correct in 78.8 per cent. of the cases. He divided his determinations into 'certain' and 'probable.' Of the former were 129 and of the latter 51, that is, he was uncertain twice in seven times. Of his fifty-one mistakes he had marked 28 'certain' and 23 'probable,' while of the 129 correct replies he had marked but 27 replies 'probable' and 102 'certain.'

Those ignorant of graphology gave nearly as great a proportion of correct answers. For instance, a studious girl of seventeen was correct in 70 per cent. of her replies. Four instructors and instructresses in the schools of France reached percentages of 72.9, 73, 73 and 73, though quite ignorant of graphology.

The author concludes with astonishing seriousness, "The gift of recognizing sexual character in writing belongs to nearly everybody, but the ablest of the 'ignorants' are still below the best graphologists"—(by less than 2 per cent. *P. F.*).

Chapter III. is devoted to photo-reproductions of addresses of which some specimens revealed the sex of the writer to all who examined them (18); others were doubtful; and still others were purposely falsified. One

written by a young girl of eighteen was characterized by M. Crépieux-Jamin as 'Certainly a man of thirty or perhaps less.' Another address written by a woman was ascribed by M. Crépieux-Jamin and by M. Eloy to a man. Dr. Binet considers sexual character in writing demonstrated in the most satisfactory manner. The percentage of error of graphologists in determining sex amounts in the most favorable cases to 10 per cent., slightly less than that of the 'ignorants.' Whether this kind of expert evidence may be used in courts he thinks depends upon the answer to the question 'Is a probable error of one tenth admissible in court expert-evidence?'

In any case, he thinks the judges should not admit the testimony of any expert unless he prove by tests that he is one.

Part II.: By what marks can age be determined from handwriting.

M. Crépieux-Jamin, after explaining that it is the physiological and not the actual age which may be deduced, gives four periods which may be distinguished, viz., youth, adolescence, young, and old adults.

In youth the lines are coarse, slow, clumsy and wanting grace; the letters differentiated by increased height.

Adolescents have more expansive and pretentious lines, many inequalities, among others the round of the 'd' turned in. The strokes are firm, distinct and have lost the heaviness mentioned of the very young.

Young adults have a still clearer handwriting, freed from calligraphic forms. Originality of character is evident. Diversity is greater than with adolescents. Each is individual.

Aged adults no longer have the lightness and freshness of line of twenty-five years. Their writing shows lines, thickened angles, marks of hesitation and depressions, *i. e.*, all the graphological indications of diminution of activity.

The following table gives the percentage of errors in the answers of M. Crépieux-Jamin compared with the percentage of errors where the determinations had been made by pure chance. This comparison is made for five separate age-periods.

Number of Errors.	Crépieux-Jamin, Per Cent.	Pure Chance, Per Cent.
Under 6 years.....	34.6	18
From 6 to 10 years.....	26	20
From 11 to 15 years.....	10	26
From 16 to 23 years.....	8	26
From 24 upwards.....	12	28

Dr. Binet concludes that his experiments support the theory of *intuitive* but not *deductive* graphology in the determination of age.

Part III.

Chapter X.: Intelligence in Handwriting. This determination is thought of greater value than the others. The following graphologists were consulted: MM. Crépieux-Jamin, Eloy, Humbert, Vié, Paulhan, Mmes. Forichon, Ungern-Steinberg and de Salberg. Dr. Binet thinks the probable errors are: (1) uncertainty of establishing the real degree of intelligence of people; (2) suggestions received from the contents of the letters; (3) recognition of some handwritings. Regarding the difficulty of determining an actual order of superiority, twenty-seven names were selected, amongst which were those of Jules Simon, Victorien Sardou, Paul Bert, Renan, Claude Bernard, Alexandre Dumas fils, Dumas (chimiste), Poincaré, Brown-Sequard, Charcot, Brunetière, Lemaitre. The second series (people of average intelligence) had to be selected with great discretion.

He eliminated from consideration those who can not write fluently; the partially and completely illiterate (especially servants); merchants, manufacturers, employees and others whose occupations require legibility and induce calligraphy, that hardest test of graphology. Thus, seven tenths of all the writers in France are excluded by these eliminations.

The two methods of experimenting were: (1) by couples; each couple containing the writing of a great, and of an average intelligence; (2) by two groups of writings, 'A' and 'B.' In 'A' 33 great were mixed with four very narrow intelligences known to Dr.

Binet. In 'B' a large number of mediocrities were mingled with Renan, Cl. Bernard and Daudet. Several experts were selected to sort these names. Average intelligence was classed from 30 to 40; talent, 40 to 50; genius 50 to 60; and the inferior grades, 1 to 30.

To avoid suggestion from the contents of a letter, envelopes were first employed; but the experts objected to the insufficiency of the material "*and their efforts were not brilliant.* In 80 replies but 61 per cent. were correct."

Dr. Binet then had recourse to personal letters, but in cutting out the signature and significant words the meaning was made obscure. (The fact that a letter was thus mutilated would stamp it as of the superior class. *P. F.*)

Another error was in the recognition of the handwriting by the expert; thus: Mme. Ungern Steinberg recognized Zola's writing.

Dr. Binet submitted to each expert a list of 100 known authors and asked if he knew the handwriting of any of them.

Chapter XII.: How is intelligence revealed in handwriting?

M. Crépieux-Jamin recognizes six degrees. Genius, talent, alert intelligence, mediocrity, insignificance and low intelligence. There are pen-strokes characteristic of each of these classes.

Genius manifests itself by power, clearness, simplicity and activity. The strokes are not of common form, but elegant, or well defined, with inequalities not discordant.

Talent has the same signs, with less clearness, simplicity and activity. The signs of cultivation (modifications of the ordinary forms of writing as abbreviations or simplifications) are as numerous as with genius.

Alert Intelligence.—Clear and Simple. Unevenness (index of intellectual sensibility without discordances) is great and gives the impression of a shudder of the pen. Precision not so great as with genius. There appear indications, absent from genius, of cunning, deception, versatility (*sic*), and violence, though not allied with each other.

Mediocrity.—Signs of incompleteness, gaps and discordances. The characters labored or verging upon vulgarity. Marks of meanness, of clumsiness, exaggerations and inequality of the strokes, lack of harmony, lack of clearness, few and not characteristic signs of culture.

Insignificance.—Infantile simplicity of the strokes, lack of energy, activity and signs of culture; even and monotonous with the spaces often exaggerated.

Low Intelligence.—Vulgar, confused and exaggerated forms without marks of culture.

M. Paulhan does not believe in the constant value of even general signs. It is the 'ensemble' of the writing. M. Vié prepared a table expressing 57 different kinds of writing with their respective significations, but other graphologists criticized the table, and M. Crépieux-Jamin refused to use it.

Chapter XIII.: A general glance at the solutions.

A table of the 35 pairs of writings representing intelligence and mediocrity are given with the grades assigned by Crépieux-Jamin, Vié and Paulhan. In the 35 cases Crépieux-Jamin gave 32 correct and 3 incorrect replies; Humbert, 28 correct, 5 incorrect and 2 doubtful replies; Vié, 29 correct and 6 incorrect replies; Paulhan, 26 correct and 9 incorrect replies.

This is the author's summary of the conclusions of the graphologists on the coupled writings. Seven experts gave answers. The majority of them were correct 32 out of 36 times. In ten cases all seven were unanimous and right. In three cases the majority were wrong. Taking the average of all as that of an exceptionally good expert, his average of success would have been 90 per cent. Writing, therefore, reveals unequally the intelligence of the writer. Graphic signs of intelligence are incontestable but are not found in the writing of *all* great intelligences. In this the case resembles physiognomies.

Chapter XV. Portraits. Successful and unsuccessful.

Dr. Binet says: "Reading a series of graphologists' opinions, one is alternately charmed by their accuracy and disgusted by their errors. One can not decide whether or not there

is any truth in graphology except by taking the average of those efforts, which (he thinks) answers the doubt affirmatively."

Madame Ungern-Steinberg graphologizes *Bertrand* (great mathematician) as 'cultivated, supple, destitute of great delicacy or clear view of things.' *Dumas* chemist (secretary of the Institut), "Mediocre intelligence, bound to routine, considerable faculties of succeeding, limited horizon. Sees nothing outside of his window pane." Köllicker (great German naturalist), "Mediocre mind, not clear, credulous and suspicious. Discouraged and deceitful. By a transparent ruse he seeks to compensate lack of judgment," etc.

Brown-Sequard.—"Intelligence below average, destitute of clearness and moderation. Impressionable imagination to the prejudice of judgment. Originally intelligence more alert than cultivated. Sum total, muddled mind" (!).

Ernest Rénan.—"Intelligence mediocre and little cultivated (!). Little reflection (!). Credulity, and babbling emphasized. The latter owing to commencing senility."

Crépieux-Jamin says of Rénan's writing: "Clear, delicate and fine mind without attaining talent" (*i. e.*, 38; talent begins at 40 of the scale). Eloy says of the same: "Good average intelligence, some deficiency of reflection but very active. What a good heart!" (He rated another letter of Rénan's similarly.)

Chapter XVI.: Shows the traps Dr. Binet laid for the graphologists.

Crépieux-Jamin, Paulhan and two others were chosen. To these four Dr. Binet sent a lying letter to say that in certain couples they had been completely misled. Among the couples of which this was falsely asserted were two where errors had really been made. Crépieux-Jamin recognized these and corrected them, but he refused to change his judgment of the mental superiority of Rénan to a small provincial lawyer, even when *falsely* told he was wrong; but on the contrary, raised the index of Rénan and lowered that of the other. He did the same when asked to reexamine the writing of Paul Bert and an unnamed official, which he had already rated 42 and 35. He retained the 35 and raised 42 to 47. "This experiment argues well for graphology," says Dr. Binet.

The others fell into the trap and recanted all they had said. Binet apologizes for lying to them, but says he did not transcend his rights as an experimenter.

His conclusion is that "*graphological reasoning may establish two diametrically opposite conclusions*—like politics and other things. It is to be desired that the reasons for opinion were less open to suggestion and more subject to proof."

Chapter XVII.: Necessity of better defining graphological terms.

Graphologists disagree: (1) by finding different 'signs'; (2) by giving different interpretations to what they find. Crépieux-Jamin says: 'Large writing—imaginative.' Paulhan says: 'Large writing—clumsiness.' Two hypotheses are suggested: (1) Graphology is an intuition, can not be explained or controlled; (2) (which is Crépieux-Jamin's view) it is based upon observation of forms, but these (may) neutralize each other.

Chapter XIX.: The achievements of those ignorant of graphology.

Experiments in judging intelligence from handwriting were made with male and female scholars in the primary schools. The masters and mistresses in four communal schools selected ten of the brightest and ten of the dullest scholars between twelve and fourteen.

The 80 envelopes, containing addresses dictated to the scholars, were submitted to 16 persons; 3 of professions, and 13 instructors and instructresses. The majority of the replies agreed with the rating of the instructors in 57, and differed in 20 cases. In 5 the agreement was unanimous; in 6 it was 17 to 1; in 10, 17 to 2. Asked to define the features on which they relied for the opinions, the most frequent replies were: (9) Place and disposition of words, specification, disposition of the address. (9) Accuracy or clumsiness, precision, decision, firmness, energy of the characters. The author asks if these were their real reasons for judging, adding, 'to judge is

one thing and to give reasons for the judgment another.'

The graphologists who tried these same documents only succeeded in 60 to 65.5 per cent. (The 'ignorants' averaged 64.4 per cent. of correct answers practically the same. *P. F.*)

In submitting to 'ignorants' a group of writings from distinguished and from mediocre intelligences the answers were 78 right and 79 wrong, *i. e.*, pure chance. "In fact, how," says Dr. Binet, "is one not endowed with intelligence to discover it in the writing of another" (!).

Chapter XX.: Conclusions.

The signs that indicate age and sex are not constant. The 'ignorant' can comprehend these signs, but less well than the graphologists (by about 0.05 per cent., *P. F.*). The same is the case with intelligence. Dr. Binet's conclusion is: "It is *possible* for graphologists (1) to read intelligence (2) in hand-writing. (1) That is, *some* graphologists. Graphology is not to be confounded with graphologists. Had we not employed Crépieux-Jamin, Vié and Humbert the conclusion as to graphology would have been more severe. (2) Certain intelligences are more revealed than others. The degree of intelligence, genius and talent is hard to determine."

'In short *there is some truth in graphology* but the graphologist's method is not infallible' (and is not sufficiently explained to give it a place as a science. *P. F.*).

Part IV.: Character in Handwriting.

Chapter XXII.: Experiment with the writing of criminals.

Fourteen honest people and eleven criminals contributed the writing studied. The experts were Crépieux-Jamin, Vié, Eloy, Paulhan, Varinard and Mme. de Salberg.

Chapter XXV.: A gallery of murderers and their writing.

Vidal.—Assassin of women. (His portrait is excessively made and repulsive. *P. F.*)

Eight lines of an autobiography written by him in prison. From details of his life Binet portrays him as cunning, cowardly, hypocritical, vindictive, boastful, lazy, violent, with low intelligence. The following diagnoses of character in handwriting are given with fullness in the translated words of the writers because it is the fairest test of the claims of graphology. The words in parentheses refer to the writing, the others to the writer.

Crépieux-Jamin says: "Vivid imagination without grace (inequalites in direction and size, faulty capitals, backhand, large discordant movements, letters too high) associated with an activity of a low order in which agitation (unevenness in size and direction, etc.), discontinuity (bond of junction of words and syllables retarding movement), mediocre (vulgar without relief) and superficial (hesitating, rounded, without relief). He deceives and procrastinates (uneven size, discordant spacing), purpose behind his expansiveness (back handed and sober with large discordant movements). Lying, from too much imagination, is habitual (very uneven size and direction, sinuous and hesitating, too much raised). Lacks reliability (very uneven size and direction, without relief). Not generous (backhand and studied soberness), not good (backhand, turning left, letters too high), but selfish. Proud (too high), not incapable, accidentally, of heroism. Feeble energy ('t's' feebly crossed if at all, hesitating, slow and uneven). Inconsistent. Gentle and violent (curves with many discordances), sensual and lazy (thick letters, heavy strokes). A nature unbalanced."

Dr. Binet praises the portrait but thinks it does not go far enough.

Vié says of this same specimen: "The writing is of a young girl (?) of temperate character (!). Principal characteristic not sentimentality, though she is capable of affection, and of altruism (?) but her emotions are controlled. Has sang froid and is mistress of herself. Principal desire is to please, (?) natural to her elevated tastes (!). She does not exaggerate modesty, but her pride is subjective, for her simple manner does not abandon her in her conduct of her life. She is timid, her lack of impulse does not permit her frankness to follow its natural course but obliges it to recur to diplomacy.

'Moderation' is her motto (?!). Her mind is clear, assimilative, of prompt conception and practical tendency. She has appreciable but not subtle delicacy (!!). Reflection, attention, notable care in seeking the best, (!) speak in favor of her judgment. Imagination not without grace, but large rather than high. What is most surprising is that her intelligence, diffuse in most young girls, is distinguished by concise and very condensed sobriety (!?). Her will shows gaps. In harmony with the timidity already noted she lacks impulse, but has tenacity and firmness in resistance. Her activity has a quality better than will power, balanced as she is in perseverance. Thus appears this young community of tendencies well disciplined under the unity of their rule—moderation (!?).

Eloy: Great impulsiveness. Nature nervous and susceptible. Effort to mark it shows his tenderness of heart, * * * delicate nature * * *. Natural instincts for development, * * * esthetic aptitude give a charm * * *. Is very young * * * sequence of ideas, good logic, good power of assimilation * * * sensitive nature * * *.

He adds with naïveté: "I have felt almost from the beginning of the examination of the eight lines that they were written by M. A. Binet at fifteen to eighteen years. After finishing the study this idea remains. Is this the fact? If so I am ready to give my reasons"(!). Dr. Binet says he is not flattered at this achievement of graphology.

Mme. X.: "Altruism trickles out of the writing. Nevertheless, the writer is not entirely good. Little scratches very feline at the extremities of the strokes and many sharp points show unusual taste for criticism. In spite of his great intelligence (!?), etc., * * *. Heart better than ideas and character. Not violent but usually irritable. Nervous-bilious, with health rather resistant than strong. This reflecting, observing man, without hampering bonds, had great aptitude for administration and organization. Both economical and able. Without being a visionary he was original. Much talent but not genius—like Taine (!?). In any case he was a *thinker* (!?).

Carron.—Parricide (killed his mother by blows of a shoemaker's pliers and a hammer. Jested of her agony before the magistrate).

Crépieux-Jamin: "Selfish. Very reserved (turning to the left), yet affectionate (inclined and uneven in size and direction). Active (rapid), but negligent (light 't's' not crossed), profoundly sensitive (very uneven). These qualities joined to a fund of gentleness (!) and even timidity (curved, rapid and expressive, without relief, with uncrossed 't's' and terminals restrained and fine). Passionate, unhappy and restless (very uneven agitated, uncoordinated, light). Not a bad man (?!). Has tender feelings (!), but his kindness not expansive, but depends on exalted judgment. Rectitude very complicated, not impeccable. He has a conscience and bursts of loyalty (natural and simple, words increasing in size). Little energy (no relief, 't's' unequally or not at all crossed). Judgment mediocre and not sure of results. Don't inspire confidence because qualities insufficient on one side. Frankness combats timidity. Great elasticity of reserve. First impulse often right, second less sincere and more expansive (enlarging, natural, simple, clear, but turning left). Reflection reduces these qualities. After all, he has attractive sides because of his alert adaptive intelligence and his emotional nature" (!).

M. Vié says of the same specimen: * * * "The writing (of Carron *P. F.*) is young and feminine, whence the conclusion that a young girl wrote it. Pleasantly airy, but commonplace from lack of relief. The labored effort shows breaks not consistent with a careful person. Some pleasing delicacies. These little shades diminish in regarding other moral qualities of this young girl, gentle, (!) modest, (!) and not coquettish (!). Moderately expansive, she enhances her reserve by frankness and naturalness. Very sensitive, but her emotions do not long disturb the serenity of her soul. Of loving nature, she possesses a guarded affection, * * * for her moderated imagination does not rest on the blue clouds in which the dreams of young girls often delight. Her activity is

fragile and can not be put to a rude test. She is imperfectly seconded by will power, but tenacious of truth (!). Very apt to attach herself to the object if it comes to her, but will not seek it" (!).

Rachel Galtié.—Poisoner. Killed husband, grandmother and loving brother.

Crépieux-Jamin: "Imagination (large pen movements)? dominates. Mediocre intelligence (graphic discordance, very vulgar and disordered). Lacks judgment and attention. Impulsive, exalted (excessive right and left turns. Words increasing in size), inconsistent (graphic discordances), disordered (disordered and agitated), negligent (uncrossed 't's,' disordered). Like most of those deficient, tries to fill gaps by pretention (ornamental, rolled 'd's,' overheightened). Liar from imagination and disorder (agitated, discordance, 't's' not crossed, right and left turns). Nevertheless, not bad (words increasing in size, small unevenness of direction, curved and clear). Dangerous because passionate and ill-fitted for life (uncrossed 't's' non-coordination of graphic movements) * * * affectionate (inclined, curved with many right-turn movements). Grateful (!) with excess of demonstrations of her very emotional and open (!) nature (very unequal in size—words enlarging—agitated). Has disagreeable rather than odious (?) sides."

The above are selected as samples.

Chapter XXVI.: Measure of individuality.

The author says disagreements of graphologists prove nothing. They disagree just as physicians disagree at the bedside of a patient. Crépieux-Jamin, as the best, is assumed to represent graphology. Of seven portraits he failed in four and succeeded in three. The writings of a batch of really high characters were submitted to him. He was asked to arrange the twenty-two good and criminal in four series of good, medium, wanting and inferior. In the first class he put one good. In the second three murderers and two good. In the third class one murderer and five good. In the fourth seven murderers and two good —dividing the names into two classes, he has seven good and four criminals in the first—four good and seven criminals in the second.

Arranging the names in couples of one good and one criminal and asking his judgment as to their comparison with each other he was right in eight and wrong in three.

Vié and Eloy erred five times in eleven in the same experiment.

Dr. Binet says the graphologists agreed in nine out of twenty-two cases. They can not decide character as well as they can intelligence, and it is uncertain if they ever will.

Chapter XXVII.: General conclusions by Dr. Binet.

"The principal end is less to ascertain whether intelligence and character can be learned from writing, than to point the path to follow in demonstrating moral phenomena. *Probably there is some truth in graphology,* cephalometry (phrenology) and chiromancy."

"The most dangerous foe to experiment is suggestion, 'the cholera of psychology,' * * * after the malice of chance. There are answers given by chance which have such a form as to fall out almost always right * * *. Calculation of chance is not alone the province of the mathematician but of the psychologist. * * * The determination of graphologists is always superior to chance and yet not infallible * * *."

"Graphological signs seem to be elastic enough to fit the most contradictory cases."

"The fault lies not in the signs but in the significations assigned to them."

"Graphology is respected more highly by the public because it is mysterious and incomprehensible."

"It is intuitive. One does not reason, one affirms, and *one only affirms with insistence what is doubtful.* * * * If the client is satisfied the performance is said to have succeeded. * * * Yet science in disdaining graphology neglects a domain vaster than one thinks. It stretches beyond the view, and contains all the empiric knowledge which is of such use to us daily, such as characters of men, prevision of their acts, and sentiments, merely from the sound of the voice, etc. When science invades this domain the present priests of half-light will flee to the realms of the

vague, undetermined, dreams and faith. I offer to collaborate with, say, M. Crépieux-Jamin."

"Graphology is an art of the future."

With slight modification one can agree with Dr. Binet in his conclusions.

There is unquestionably a trace of the man left in every act he performs, but the trace left in writing has not been shown to be a better guide to a knowledge of the sex of the writer than a footprint; of the age than a view of the garments; of the intelligence than the weight of the brain; nor of the character than the appearance of his umbrella. It is not within the power of true science to say that such and such can never be attained, but so far as graphology is concerned we may cite the experiments of its greatest investigator to prove that as yet it has furnished no reliable means of attaining to a knowledge of sex, age, intelligence or character from handwriting.

Persifor Frazer.

Philadelphia, September, 1906.

Genera Avium. Edited by P. Wytsman. 4to. Brussels: V. Verteneuil and L. Desmet. Part I., Passeres—Fam. Eurylæmidæ. By Ernst Hartert. 1905 (1904). Pp. 8; pl. I. Part II., Picariæ—Fam. Todidæ. By P. Wytsman. 1905. Pp. 4; pl. I. Part III., Psittaci—Fam. Stringopidæ. By T. Salvadori. 1905. Pp. 2; pl. I. Part IV., Psittaci—Fam. Nestoridæ. By T. Salvadori. 1905. Pp. 3; pl. I. Part V., Psittaci—Fam. Cacatuidæ. By T. Salvadori. 1905. Pp. 7; pls. II.

The first five parts of this important work, which is intended to include the birds of the world, are all that have appeared up to the present time. All bear the date 1905, though part one was issued also as a sample number during the first half of 1904. Each part is separately paged and contains but a single family. The introductory portion consists of a short historical account of the group treated, its anatomical characters, general habits, range and bibliography. Then follows a key to the subfamilies, if there are any, succeeded by a systematic treatment of the subfamilies, genera and species. Under each subfamily there is a key to its genera; while for each genus are given brief synonymy, generic characters, geographical distribution, a key to the species and a list of species with geographical distribution and a little, often incomplete, synonymy.

The Eurylæmidæ—more properly Eurylaimidæ—(part I.) are divided by Dr. Hartert into two subfamilies—Calyptomeninæ and Eurylæminæ—the first consisting of a single genus with three species, the second of six genera. One form, *Psarisomus dalhousiæ borneensis,* from the mountains of northwestern Borneo, is described as new. The accompanying plate represents the heads of several species. The general treatment of this group is very satisfactory, but we are not quite sure that all the forms treated as subspecies are not in reality distinct, though, of course, closely allied species. More careful proof-reading, moreover, would have avoided several very unfortunate errors in scientific names.

The Todidæ (part II.), a family restricted to the Greater Antilles, comprise but a single genus, of which four forms are recognized here. *Todus pulcherrimus* Sharpe is treated as a synonym of *T. hypochondriacus,* and apparently with reason; but we are not at all satisfied that the four admitted forms are merely subspecies, as our author thinks. All are represented on the accompanying plate.

The New Zealand family Stringopidæ—or, as it should be spelled, Strigopidæ—(part III.) has only a single genus of two species, one of which is doubtful—probably but an individual aberration. The plate illustrates various details of *Strigops habroptilus,* including the head of an interesting xanthochroic variety.

Of the New Zealand family Nestoridæ (part IV.) six species, all in the genus *Nestor,* are admitted, but two of these are doubtfully valid, and one is extinct. Four of the forms appear on the single plate.

The Cacatuidæ (cockatoos) (part V.) are divided into two sub-families—Cacatuinæ and Calopsittacinæ. The first is composed of six genera, including provisionally Newton's curious *Lophopsittacus* from Mauritius. In *Ca-*

catua, the largest genus, fourteen species are recognized, and four additional subspecies are casually mentioned, although the latter seem worthy of a more prominent place. The second subfamily contains only the single species *Calopsittacus novæhollandiæ.* The two plates depict nine species.

Altogether, these first five parts of 'Genera Avium' are very creditable. The arrangement is good, the exposition clear, and while not so ample as some might wish, is yet probably sufficient for the purpose of the publication. The letter press is quite attractive in appearance; and the plates, all of which are colored, are excellent. This work will prove very useful to all who wish to keep abreast of the times, and will be well-nigh indispensable to the working ornithologist.

HARRY C. OBERHOLSER.

SCIENTIFIC JOURNALS AND ARTICLES.

The American Journal of Science for October contains the following articles:

A. L. DAY AND E. S. SHEPHERD: 'Lime-Silica Series of Minerals,' with optical study by F. E. Wright.

O. C. FARRINGTON: "Analysis of 'Iron Shale' from Coon Mountain, Ariz."

N. T. BACON: 'Phenomena Observed in Crookes' Tubes.'

I. BOWMAN: 'Northward Extension of the Atlantic Preglacial Deposits.'

H. C. BRADLEY: 'A Delicate Color Reaction for Copper, and a Microchemical Test for Zinc.'

A. HILEMAN: 'Elimination and Alkalimetric Estimation of Silicon Fluoride in the Analysis of Fluorides.'

C. BARUS: 'Note on the Actual Drop of Pressure in the Fog Chamber.'

C. BARUS: 'New Method for Standardizing the Coronas of Cloudy Condensation.'

DISCUSSION AND CORRESPONDENCE.

STEPHENS'S CALIFORNIA MAMMALS.

IN no part of the world is the effect of segregation and isolation as a factor in species-forming more evident than in California. No other state of our union offers such diversities of physical conditions, or such a variety of barriers to the dispersion of animals. A faunal map of California has been compared to a crazy quilt, because any such map must recognize the limiting and modifying effects of the different sets of environment connected with the hills, valleys, mountains, lakes and streams of this varied land.

Because of the varying degrees of segregation produced by barriers of mountain and climate, the non-migratory animals of California are especially numerous in species, and many of the recognized species are broken up into numerous subspecies. Each form finds its nearest ally farther on, across the range; and, again, types once differentiated may invade each other's territory, when conditions enable individuals to cross the border.

In a volume called 'California Mammals' (West Coast Publishing Company, San Diego), Mr. Frank Stephens, of San Diego, has brought together compact descriptions of all the mammals thus far recorded from California. The descriptions are carefully written, the accounts of habits are full and accurate, the volume is well printed, and it can not fail to be of great value to the students of California beasts. Two hundred and seventy-six species and subspecies are included in the list. The volume contains also an excellent essay on the 'Life Areas of California.' Under the head of *Homo sapiens americanus,* the most specialized of the indigenous mammals of California, is given a map showing the distribution of the twenty-one linguistic stocks.

DAVID STARR JORDAN.

AN IGNORED THEORY OF THE ICE AGE.

LOOKING over the recently issued work on 'Geology' by Professors Chamberlin and Salisbury, I was surprised and disappointed to learn that in this voluminous publication of nearly two thousand pages, many of which are devoted to considerations of causes leading up to the ice age, the name of Dr. Marsden Manson is not to be found.

In a work like this, designed for the use of students and general readers, views antagonistic to generally accepted dogmas and pet theories, should, when endorsed by recognized authority, find fair treatment.

Manson's theory of the ice age has been favorably received by some eminent geologists. Thirteen years ago, shortly after Manson's memoir entitled 'Geological and Solar Climates' was first published, I wrote,[1] from an astronomer's point of view, as follows:

Under the above title Dr. Marsden Manson has published a thesis, issued by the University of California, of more than ordinary merit. Geologists tell us that large areas of now densely populated regions of the earth were at one time covered with ice to a depth of many feet. To most scientists the explanations hitherto given, to account for the cause of the so-called *Glacial Epoch*, seem wholly inadequate. Dr. Manson's treatment of the problem is unique, and to many it will appear quite convincing. We do not hesitate to recommend it for careful study to those interested in astro-geological physics.

I now copy, word for word, the last paragraph of a recent paper entitled 'The Causes of the Glacial Epoch,' written by a recognized leader in science. He concludes as follows:

It does seem to the writer that unless it can be shown that the temperature prevailing at the beginning of the glacial epoch could not have been high enough to maintain a cloud envelope, Manson's theory as outlined above must be considered as the most probable among those that have heretofore been suggested, as fulfilling both qualitatively and quantitatively the postulates of the great Ice Age; not excluding of course the probable influence of the agencies claimed by Arrhenius and Chamberlin as the chief ones, but which appear to the writer to be inadequate to account for the phenomena in actual evidence.

Such is the testimony of a geologist of world-wide fame.

J. M. Schaeberle.

Ann Arbor,
August 30, 1906.

[1] See No. 32, 'Publications of the Astronomical Society of the Pacific.'

NON-EUCLIDEAN GEOMETRY.

To the Editor of Science: My attention has been called to some quotations from a private letter of mine in an article by Professor George Bruce Halsted on 'The Value of the Non-Euclidean Geometry,' which appeared in the November number of the *Popular Science Monthly*, 1905. The letter referred to was written by me to the author in answer to a query of his of March 21, 1904, couched in the following words:

I am *curious* to know, if in the face of such a statement as Poincaré's in his review of Hilbert, 'The postulate of Euclid then can not be demonstrated; and this impossibility is as certain as any mathematical truth whatsoever,' you actually still think that you have proved it, or that you have proved that external space is necessarily Euclidean.

In view of the fact that the quotations do not adequately express my views, I beg you for the privilege of being granted some of your valuable space for the publication of my letter in full. The true copy of my letter dated March 25, 1904, follows. The quotations are enclosed in brackets:

My dear Professor Halsted—Your letter of the 21st inst. has just reached me. From its tone I conclude that you are in earnest about the matter, and I am glad to have found in you a man who intends to read the work. The dissertation was written for the purpose of bringing before the mathematical world certain contentions—no matter how seemingly heterodox—for which a scientific basis is claimed to have been laid down in the new treatment and in the new point of view; and, of course, if the claim is not well established, then either the treatment or the point of view is open to criticism—and *fair criticism*, whether favorable, or *unfavorable*, is cordially invited, even solicited. [As to Poincaré's assertion about the impossibility of proving[1] the Euclidian postulate, it is no more than a belief—though an enthusiastic one—never proved mathematically, and in its very nature incapable of mathematical proof,] unless we are certain that space is non-Euclidian. [Poincaré is undoubtedly a great mathematician, perhaps the greatest now living; but his assertion of his inmost conviction, no matter how strongly put, can not pass for mathematical truth, unless *mathematically* proved. His conclusion—shared also by many another noted mathematician, as well as by the founders of the non-Euclidian geometries—can only be based on the fact of the existence of these last geometries, self-consistent and perfectly log-

[1] I stand corrected with regard to the germanisms, 'impossibility to prove,' 'impossibility to establish,' which appeared in the original text of the letter.

ical. But this is a poor proof of the impossibility of establishing[1] the Euclidian postulate,] since the non-Euclidian systems have to deal with a different class of phenomena; such are the metrical relations upon the sphere and the pseudosphere in two-dimensional point-space, and those holding in three-dimensional curved manifolds contained in n-dimensional space, or in space whose element is changed from that of a point in the ordinary Euclidian sense to some other geometrical entity depending on n coordinates, like Plücker's four-dimensional line-space. I should refer you for the elucidation of this point of view to pp. 27–32 of the dissertation, especially to p. 29 and sequel, where a quotation from Bianchi is discussed and refuted.

The difference between my position and yours is, it seems, as follows: while you maintain that external space is either Euclidian or non-Euclidian, and there is no possibility of ever finding out which, for the Euclidian postulate can neither be proved nor disproved, I assert that external space is both Euclidian and non-Euclidian, according to the point of view. [If space is regarded as a point-manifold, it is Euclidian, and the postulate can be proved, as soon as we are allowed to look for its establishment in three-dimensional geometry,] of which two-dimensional geometry is only a part. If space, however, is regarded as a line-manifold, say, then *certain* two- and three-dimensional manifolds contained in it are non-Euclidian. So, for instance, all lines passing through a point represent [the two-dimensional elliptic geometry discussed by Klein, Lindemann and Killing], which, [according to my opinion, is an absurdity for a point-space in the ordinary sense of the term]. As to [Poincaré], he seems to stand on a very similar basis—namely, in that he does not oppose the non-Euclidian to the Euclidian geometry and [says that all depends upon convention] as to what we understand by distance, straight line, angle, etc. [But still he deduces from this the perfectly gratuitous conclusion that therefore the parallel-postulate can not be proved.] It is gratuitous, according to my opinion, because, as the simultaneous existence of both the Euclidian and the non-Euclidian groups of motion have been proved beyond a shadow of doubt, they must evidently refer to different classes of phenomena, and hence there must exist a Euclidian space and a non-Euclidian space. And as the actual space is only one, all must depend upon the point of view (the entity taken as the space element). Therefore, for point-space the postulate may be a necessity, without involving its necessity for other three-dimensional manifolds, like certain line-complexes, for instance,—just as plane geometry, even if it were admittedly Euclidian, would not have to hold for the geometry of the sphere or the pseudosphere.

You will observe that the groups of motion in Lie's treatment are deduced from the assumption of an *analytical* point, that is some entity depending upon a certain number of coordinates $x_1, x_2, \cdots x_n$, and, evidently, the entity in this case is indeterminate. You may call it point, but it may actually correspond to something quite different from what we understand by this name in *elementary geometry*.

I trust that, according to the maxim that *curiosity* is the mother of all knowledge, the perusal of my treatise, in pursuance of the gratification of this laudable feeling, may change your attitude upon this question, and will convince you that, instead of the different systems of geometry warring with each other, they are actually in peace,—the non-Euclidian systems, however, still needing interpretation in *many particulars*—an interpretation realizable in *our* space, in the space in which all of us live and think and work and strive for perfection.

I. E. RABINOVITCH.

SPECIAL ARTICLES.

INHERITANCE OF COLOR COAT IN SWINE.

MR. Q. I. SIMPSON, the well-known swine breeder of Palmer, Ill., is conducting several series of crosses between different breeds of swine, the breeds thus far used being Tamworth (red), Yorkshire (white), Poland China (black with white points), the wild boar of Europe and Duroc-Jersey (red).

He bred a wild boar to a Tamworth sow, securing a large litter all much resembling the wild boar, having his color, snout, eyes, ears, length and size of legs, tail, shape of body, size, wildness and characteristic movements. From two of these hybrid pigs and a Tamworth boar he has secured three litters, each containing four pigs. What the usual litter of wild pigs is I do not know, but the Tamworth litter is usually eight or more pigs. The body color of these three litters is as follows:

Litter No. 1—	3	wild boar's color.
	1	Tamworth red.
Litter No. 2—	1	wild boar's color.
	3	Tamworth reds.
Litter No. 3—	2	wild boar's color.
	2	Tamworth reds.

The sum of these results agree exactly with the highest Mendelian expectation if we assume the two coat colors to constitute a character pair, the color of the wild boar being dominant.

A cross between a Tamworth boar and a Yorkshire sow resulted in eleven pigs, all alike: hair entirely white; skin dark with white spots, but with a white belt extending entirely around the body at the shoulders, and including the fore legs; face dished like the Yorkshire but with long snout of the Tamworth. One of these hybrids (male) was crossed with a Tamworth colored three fourths Tamworth, one fourth Yorkshire, with the following interesting result:

Representing the body color of the Tamworth by R (r when latent), and that of the white breed by W, the Mendelian formula for this complex breeding would be

$$\left.\begin{matrix} R \\ W \end{matrix}\right\} \left.\begin{matrix} R \\ Wr \end{matrix}\right\} \left\{\begin{matrix} \frac{1}{2}R_1 \\ \frac{1}{2}Wr \end{matrix}\right. \qquad \left.\begin{matrix} Wr_1 \end{matrix}\right\} \left\{\begin{matrix} \frac{1}{2}Wr \\ \frac{1}{2}R \end{matrix}\right.$$

the R_1 being the three fourths Tamworth, one fourth Yorkshire dam, the Wr_1 being the hybrid Tamworth-Yorkshire sire. To agree with this formula, half the progeny should be white (dominant hybrid) and half red (extracted recessive). There were eight pigs in the litter, four of which were of a rich Tamworth red color, and four with hair light gray tinged with red, white skin with dark patches, and the characteristic white belt of the original hybrids. These results indicate that the red and white coats of these breeds form a character pair, with white dominant, as it is in the Yorkshire-Berkshire and the Yorkshire-Poland China crosses (unpublished results of the writer). They also indicate that the dominant hybrid (Wr) shows traces of recessive characters present, as all the Wr progeny thus far produced show the peculiar white belt of skin color around the body, and (in all but the original Wr litter) have a reddish tinge in the hair color.

The same Wr male was bred to a Poland China sow (black with white points), the formula for which breeding (assuming red dominant over black) would be

$$\left.\begin{matrix} Wr \\ B \end{matrix}\right\} \left\{\begin{matrix} \frac{1}{2}Wb \\ \frac{1}{2}Rb \end{matrix}\right.$$

This calls for half the progeny white and half red. The actual results were four white or black and white, and five red or black and red. In each case the recessive black appeared to a greater or less extent. Of the four, two were pure white with dark skin, one was black and white spotted, and one was black with white points, like a pure Poland China. In Yorkshire-Berkshire crosses I have found the usually recessive black appearing conspicuously in some Wb individuals, so that these results are explained by assuming incomplete dominance of white. Of the five showing red color, three were nearly pure Tamworth red, having only a few black spots, and two were red and black spotted. This indicates a tendency for red to dominate black, but the dominance varies, and is almost never complete.

One of the above red- and black-spotted boars was bred to three Poland China sows. The formula for this breeding may be written

$$\left.\begin{matrix} R \\ W \end{matrix}\right\} \left.\begin{matrix} Wr \\ B \end{matrix}\right\} \left\{\begin{matrix} \frac{1}{2}Wb \\ \frac{1}{2}RB \end{matrix}\right. \qquad \left.\begin{matrix} B \end{matrix}\right\} \left\{\begin{matrix} \frac{1}{2}RB \\ \frac{1}{2}B \end{matrix}\right.$$

Remembering that the Poland China black appears either as black and white spotted or black with white points in pure Poland Chinas, we should expect half of each litter to be red and black spotted and half black and white spotted (or black with white points). The results were

	BR Spotted.	*Bl* and *Wh.* Spotted.
Litter No. 1.....	4	4
Litter No. 2.....	3	3
Litter No. 3.....	3	3

All the above results meet the highest Mendelian expectation on the assumptions made regarding character pairs and dominance. We should expect some departure from the highest expectation. In the following we find it.

The same *RB* boar used in the last cross was bred to a one eighth Duroc-Jersey (red-*R'*) seven eighths Poland China sow having perfect Poland China markings. The highest expectation is shown in the formula of this breeding.

$$\left.\begin{matrix} R \\ W \end{matrix}\right\} Wr \left.\begin{matrix} \\ B \end{matrix}\right\} \left\{\begin{matrix} \frac{1}{2}Wb \\ \frac{1}{2}RB \end{matrix}\right.$$

$$\left.\begin{matrix} R' \\ B \end{matrix}\right\} R'B \left.\begin{matrix} \\ B \end{matrix}\right\} \left\{\begin{matrix} \frac{1}{2}R'B \\ \frac{1}{2}B \end{matrix}\right.$$

$$\left.\begin{matrix} \\ B \end{matrix}\right\} B_1 \left\{\begin{matrix} \frac{1}{2}RB \\ \frac{1}{2}B \end{matrix}\right.$$

The Duroc-Jersey red (*R'*) seems to have been eliminated in the breeding of the dam B_1. Here the highest expectation is that half of the progeny should show red markings; four of them were red and black spotted and two nearly pure red with a few black spots, indicating that they were all of the *RB* type, a case the probability of which in this particular cross is one sixty-fourth.

The above results can not be regarded as conclusive concerning any of the points involved, but they do render it highly probable that there are good Mendelian characters in this class of animals. They are published with the hope of stimulating further enquiry along this line.

W. J. SPILLMAN.
U. S. DEPT. OF AGRICULTURE.

CURRENT NOTES ON METEOROLOGY

VAGARIES OF LIGHTNING.

A PAPER in the *Quarterly Journal of the Royal Meteorological Society* for July, by Alfred Hands, deals with 'Some So-called Vagaries of Lightning Reproduced Experimentally.' Lightning is an electric charge, the author says, and should act in accordance with the laws that are known to govern discharges. In the course of an extended investigation into the effects of lightning, Mr. Hands has come across many cases that have been called vagaries, but which on close inspection have proved to be extraordinary only in the erroneous way in which they were described. Had they been correctly reported, they would have appeared perfectly consistent with ideas previously held—in fact, they could have been foretold in every case if the conditions that led to those effects had been known before the events occurred.

Mr. Hands reproduced experimentally several so-called vagaries of lightning, showing by means of skeleton models the conditions under which they occurred, and by a single discharge producing effects which would be most perplexing if the arrangement of the hidden links in the alternative path of conduction were not known.

AFRICAN HUTS ON POLES TO ESCAPE MOSQUITOES.

THE placing of native dwellings on poles to elevate them above the ground during overflows in the rainy season has long been known as an interesting illustration of the influence of climate upon architecture. In an account of a journey 'From Mombasa to Khartum: through Uganda and down the Nile,' Sir Charles Eliot notes the use of platforms on poles ten or twelve feet high by some of the native tribes along the Bahr-el-Gebel. These platforms serve as places of repose when mosquitoes are very abundant, for it is found that the mosquitoes do not go far above the ground (*Scot. Geogr. Mag.*, 1906, 350).

PILOT CHARTS.

THE monthly pilot charts of the North Atlantic and North Pacific Oceans, issued by the Hydrographic Office of our Navy, are well known. Five years ago the British Meteorological Office began the publication of monthly North Atlantic pilot charts, and has now undertaken *Monthly Meteorological Charts of the Indian Ocean North of 15° South Latitude, and Red Sea.* The first number is for May, 1906. Two pilot charts are published by the Deutsche Seewarte, at Ham-

burg, one for the North Atlantic and Mediterranean, issued monthly, and one for the North Sea and Baltic, issued quarterly.

NOTES.

An investigation into the Beaufort wind-scale and its relation to measured wind velocities has been made in England, and the results are published in an official report ('Report of the Director of the Meteorological Office upon an Inquiry into the Relation between the Estimates of Wind-Force according to Admiral Beaufort's Scale and the Velocities recorded by Anemometers belonging to the Office,' London, 1906).

R. DeC. Ward.

CEREBRAL LOCALIZATION OF MUSICAL TALENT.

Dr. S. Auerbach has published an interesting contribution[1] to the cerebral localization of the musical talent in a description of the surface morphology of the brain of Professor Naret Koning, late director of the opera in Frankfurt a. M. The report includes a comparative study of the brain of the celebrated composer Hans v. Bülow, for some time in the possession of Professor Edinger, and of brains of other eminent men, of known musical talent, previously described. The author finds in the considerable breadth and configuration of the (supra)marginal gyre, as well as the adjacent portion of the supertemporal gyre, an expression of the greater aptitude for the multitudinous associations in the auditory sphere which distinguished these persons from others less musical. The author goes on to show that the corresponding portions of the skull usually indicate this redundancy.

As has been urged frequently by cerebral morphologists in America, contributions of this kind make it highly desirable to secure for comparison more brains of persons of peculiar aptitudes in various lines of mental activity. Not only the brains, but also the skulls, head-casts and photographs taken in accordance with approved anthropometric methods are needed. The preservation of the brain is requisite not only for macroscopic study, but also for researches in the minute structure of the redundantly developed regions.

Edw. Anthony Spitzka.

[1] *Archiv für Anatomie und Physiologie,* Anatomische Abteilung, 1906, pp. 197–230, Plates XII.–XVII.

GRANTS FOR SCIENTIFIC RESEARCH BY THE BRITISH ASSOCIATION.

At the recent York meeting of the British Association, as we learn from *Nature,* grants of money appropriated for scientific purposes by the general committee were:

	£	s.	d.
Section A—Mathematical and Physical Science.			
Electrical Standards	50	0	0
Seismological Observations	40	0	0
Magnetic Observations at Falmouth	40	0	0
Magnetic Survey of South Africa	25	7	6
Further Tabulation of Bessel Functions	15	0	0
Section B—Chemistry.			
Wave-length Tables of Spectra	10	0	0
Study of Hydro-aromatic Substances	30	0	0
Dynamic Isomerism	30	0	0
Section C—Geology.			
Life Zones in British Carboniferous Rocks	12	7	7
Erratic Blocks	21	16	6
Fossiliferous Drift Deposits	25	19	0
Fauna and Flora of British Trias	10	0	0
Crystalline Rocks of Anglesey	7	18	11
Faunal Succession on the Carboniferous Limestone of S. W. England	15	0	0
Correlation and Age of South African Strata, etc.	10	0	0
Investigation of the Speeton Beds at Knapton	10	0	0
Section D—Zoology.			
Index Animalium	75	0	0
Table at the Zoological Station at Naples	100	0	0
Development of the Frog	5	14	6
Respiratory Phenomena and Color Changes in Animals	11	2	0
Experiments on the Development of the Sexual Cells	5	0	0
Section E—Geography.			
Oscillations of the Land Level in the Mediterranean Basin	50	0	0

	£	s.	d.
Rainfall and Lake and River Discharge.	10	0	0
Section F—Economic Science and Statistics.			
International Trade Statistics.....	15	0	0
Gold Coinage in Circulation in the United Kingdom	10	0	0
Section H—Anthropology.			
Excavations in Crete.....100	0	0	
Glastonbury Lake Village.....	30	0	0
Excavations on Roman Sites in Britain	15	0	0
Anthropometric Investigations.....	17	17	3
Age of Stone Circles.....	3	0	0
Anthropological Photographs.....	3	3	6
Section I—Physiology.			
Metabolism of Individual Tissues.....	45	0	0
The Ductless Glands.....	25	0	0
Effect of Climate upon Health and Disease	55	0	0
Section K—Botany.			
Physiology of Heredity.....	30	0	0
South African Cycads, etc.....	35	0	0
Botanical Photographs.....	5	0	0
Structure of Fossil Plants.....	5	0	0
Peat Moss Deposits.....	7	5	7
Marsh Vegetation	15	0	0
Section L—Educational Science.			
Studies suitable for Elementary Schools	10	0	0
Conditions of Health in Schools.....	5	0	0
Corresponding Societies Committee.			
For Preparation of Report.....	20	0	0
Total	1061	12	4

THE SILLIMAN LECTURES AT YALE UNIVERSITY.

THE Silliman lectures for 1906 will be given in the Sloane Laboratory of Yale University by Professor Walther Nernst, of the University of Berlin, beginning on October 22. The subjects of the twelve lectures are as follows:

1–3. 'General Application of Thermodynamics to Chemistry. The Equation of the Reaction Isochore $Q = RT^2(d \ln K/dT)$.' Monday, October 22; Tuesday, October 23; Wednesday, October 24.

4. 'Integration of this Equation and Preliminary Discussion of the Undetermined Integration Constant.' Thursday, October 25.

5–6. 'The Relation between the Internal and the Free Energies at Very Low Temperatures.' Friday, October 26; Monday, October 29.

7–8. 'Determination and Evaluation of the Integration Constant by means of the Curve of Vapor Pressure.' Tuesday, October 30 (two hours).

9. 'New Experimental Researches on Chemical Equilibrium at High Temperatures.' Wednesday, October 31.

10–12. 'Examples for the Theoretical Calculation of Chemical Equilibrium from the Heat of Reaction: (*a*) Homogeneous Systems; (*b*) Heterogeneous Systems.' Thursday, November 1; Friday, November 2 (two hours).

The Silliman memorial lectures on subjects connected with 'the natural and moral world' were established by the will of Augustus Ely Silliman, of Brooklyn, N. Y. The Mrs. Hepsa Ely Silliman memorial fund, which supports this lectureship, came into the possession of Yale University in 1901. The preceding lecturers have been:

1903. PROFESSOR THOMSON, Cambridge University: 'Electricity and Matter.'

1904. PROFESSOR SHERRINGTON, University of Liverpool: 'Integrative Action of the Nervous System.'

1905. PROFESSOR RUTHERFORD, McGill University: 'Radioactive Transformations.'

HONORARY DEGREES AT HARVARD UNIVERSITY.

AT the academic session held in Sanders Theater on September 26, in connection with the dedication of the new buildings of the Medical School, honorary degrees were conferred by President Eliot in the following words:

In accordance with time-honored university usage on occasions of rejoicing, I now create, in exercise of authority given me by the president and fellows and the board of overseers,

HONORARY DOCTOR OF ARTS.

Charles Allerton Coolidge, architect, designer of admirable buldings for academic and scientific uses in California, Illinois, New York and Massachusetts; designer of the monumental new buildings of the Harvard Medical School, buildings in which are combined spaciousness, splendor of material, fine grouping, durability and careful adaptation to their special uses; through professional skill and patience an influential promoter of the purposes and wishes of the Medical Faculty.

HONORARY DOCTOR OF SCIENCE.

Simon Flexner, born and brought up to the standing of a physician at Louisville, Kentucky, trained as a student and professor of pathology chiefly at the Johns Hopkins University; productive investigator and author in bacteriology and pathology; since 1904 director of the laboratories of the Rockefeller Institute for Medical Research, and there the competent master of great resources for the immediate and constant advancement of Medical Science.

DOCTORS OF LAWS.

John Collins Warren, instructor and professor of surgery in Harvard University for thirty-five years; author, and eminent practitioner in surgery; the enthusiastic, winning and indefatigable promoter of the great undertaking of the Medical School, who knew how to inspire others with his own well-grounded hopefulness and ardor.

Henry Pickering Bowditch, for thirty-five years chief teacher of physiology in Harvard University; for ten years dean of the Medical School; investigator, as well as teacher and administrator; whose imagination conceived, whose faith foresaw the new Medical School, and who contributed to the realization of his vision by diligent labor in the cause and through the confidence which others felt in his foresight and sagacity.

José Ramos, professor of pathology and chief of the clinical staff in the Medical School of Mexico, officer of the Medical Institute of Mexico, senator from the state of San Luis Potosi, in whose welcome presence Harvard University gladly remembers that the University of Mexico was her elder sister on the American continent.

Franz Keibel, professor of anatomy in the University of Freiburg, eminent investigator in anatomy and embryology, worthy representative of German genius for medical research and teaching.

Charles Scott Sherrington, lecturer and professor at the University of London, St. Thomas's Hospital and the University of Liverpool; distinguished experimental physiologist, and especially neurologist; public-spirited and active member of famous scientific societies and serviceable medical organizations.

Francis John Shepherd, professor of anatomy in McGill University; Canadian by birth, education and service; distinguished surgeon; active contributor to professional literature; ready sharer in the public functions of the profession, and in its works of charity and good will.

Sir Thomas Barlow, professor of Clinical Medicine, physician to His Majesty's Household and to University College Hospital; eminent general practitioner and consultant.

Abraham Jacobi, a medical graduate of Bonn University in 1851, and a practising physician in New York since 1853; professor of the diseases of children since 1860; officer in many hospitals and medical societies; productive author; alert, energetic, progressive practitioner; honored medical veteran.

And in the name of this society of scholars I declare that they are entitled to the rights and privileges pertaining to their several degrees, and that their names are to be forever borne on its roll of honorary members.

SCIENTIFIC NOTES AND NEWS.

The University of Aberdeen celebrated last week the four hundredth anniversary of its foundation with some three thousand delegates in attendance. According to a cablegram to the daily papers, the degree of doctor of laws was conferred on 110 of the delegates, including Professor F. W. Clarke, chief chemist of the U. S. Geological Survey; Dr. Arnold Hague, geologist of the U. S. Geological Survey; Dr. J. William White, professor of surgery in the University of Pennsylvania, and Professor Howard A. Kelly, professor of gynecology in the Johns Hopkins University.

Professor E. L. Nichols, of Cornell University, and Professor Wm. T. Sedgwick, of the Massachusetts Institute of Technology, will make the addresses at the formal dedication of the new Eastman science building at Rochester University, which will house the departments of physics and biology. It is expected that the dedication will take place during the month of October.

Sir William Perkin has arrived in this country. As has already been announced, the jubilee of the foundations of the coal-tar industry by the discovery of mauve will be celebrated at a banquet at Delmonico's on Saturday evening. Other entertainments have been arranged for Sir William Perkin, including a smoker at the Chemists' Club, New York City, and a dinner at Boston.

Dr. Charles F. Chandler, professor of chemistry in Columbia University, has re-

ceived from the University of Göttingen a renewal of his degree of doctor of philosophy granted fifty years ago.

DR. GEORGE L. STREETER, instructor in anatomy in the Johns Hopkins University, and Dr. Shinkishi Hatai, assistant in neurology in the University of Chicago, have been added to the staff of the Wistar Institute of Anatomy, Philadelphia.

DR. D. H. CAMPBELL, professor of botany at Stanford University, has returned after an absence of a year. He attended last year the International Botanical Conference in Vienna and the South African meeting of the British Association for the Advancement of Science. He subsequently spent a considerable time in the Botanical Gardens at Peridinia, Ceylon, and Buitenzorg, Java.

DR. N. L. BRITTON, director of the New York Botanical Garden, Mrs. Britton and Professor Lucian M. Underwood, of Columbia University, have spent the past month in Jamaica, where the garden maintains at Chincona a tropical laboratory.

DR. C. B. ROBINSON, assistant curator of the New York Botanical Garden, spent the month of August in Nova Scotia making collections for the garden.

STAFF SURGEON ALEXANDER GASKILL, of the British Royal Navy, is in America studying naval hospital methods.

DR. BRADLEY M. DAVIS will spend next winter in Cambridge, Mass. (17 Felton Hall). His immediate work will be the completion, with Mr. Bergen, of a laboratory and field manual to accompany the 'Principles of Botany,' which has recently appeared from the press of Ginn and Company.

DR. GEORGE BRUCE HALSTED, F.R.A.S., has accepted the headship of the department of mathematics in the State Normal School of Colorado at Greeley. Dr. Halsted's translation of Poincaré's 'The Value of Science' is appearing as a serial in the *Popular Science Monthly*, to be later a companion volume to his 'Science and Hypothesis.'

SIR GEORGE WATT, C.I.E., reporter an economic products to the Indian government, delivered the opening address of the session at the School of Pharmacy of the Pharmaceutical Society of Great Britain, and the president of the society presented the Pereira medal on October 1.

DR. SAMUEL SHELDON gave the presidential address before the American Institute of Electrical Engineers, New York City, on September 28, his subject being 'The Work of the Institute.'

A MEDAL in memory of Fritz Schaudinn, to be awarded every second year for distinguished work in micro-biology, has been established at the Hamburg Institute of Tropical Diseases, with which Schaudinn was connected at the time of his death.

A MONUMENT to Ignaz Semmelweis, the distinguished physician, was unveiled with appropriate ceremonies at Budapest on September 30.

DR. FELIX LEOPOLD OSWALD, the author of numerous books and articles on natural science, born in Belgium in 1845, and recently residing at Grand Rapids, Mich., was killed by a train at Syracuse on September 27.

THE death is announced of Professor H. Cohn, of the University of Breslau, known for his work in ophthalmology.

IT is announced that the German government will hold in Berlin in 1912 an international exposition, which will be planned on a scale surpassing all previous expositions of this character.

IT is reported that the Ontario cabinet is considering the establishment of a department of public health.

AFTER the opening of the Institute of Cancer Research at Heidelberg on September 25, an International Conference on Cancer was held at Frankfort-on-the-Main on September 26 and 27.

IN view of the continuance of the disastrous epidemics of plague, cholera and smallpox, and the heavy perennial mortality from malaria, the government of India has decided to create an entirely new service of sanitary engineers, whose special province it will be to safeguard public health. A committee of experts has

been appointed to consider the details of the scheme.

We learn from *Nature* that the Association des Industriels de France contre les Accidents du Travail intends offering a prize of 8,000 francs for an international competition for a new galvanic battery or accumulator which, while having a large output for its size and weight, must not be dangerous in use. Inquiries should be addressed to the director of the society, rue de Lutèce, Paris, who will supply further particulars, and to whom competitors must send their descriptions and drawings.

The London *Times* reports that at its plenary sitting at Brussels on September 11 the International Polar Exploration Congress voted unanimously for the formation of an international polar commission. The members of the commission are to hold office for six years. Corresponding members may be nominated among men of science and others who have in any way assisted polar exploration. The commission is to elect by vote a president, vice-president and secretary for a term of three years. The commission is forbidden to undertake any operations of a financial nature. Its primary aims are to bring about closer relations among polar explorers, to coordinate scientific observations and to assist polar enterprise, without, however, organizing expeditions on its own account.

UNIVERSITY AND EDUCATIONAL NEWS.

By the death of the sister of the late W. W. Guiteau, Cornell University will receive the legacy left by him, said to amount to between $100,000 and $200,000.

The courts have handed down a decision by which the University of Rochester will receive the $75,000 bequeathed to it by the late Lewis H. Morgan.

The new building for the Atlanta College of Physicians and Surgeons has been erected at a cost of $75,000.

In connection with the celebrations of the fourth centenary of the University of Aberdeen, the new buildings, erected at a cost of $1,250,000, were opened by King Edward.

Augustus Trowbridge, Ph.D. (Berlin), professor of mathematical physics at the University of Wisconsin, has been called to Princeton University. We have already noted the call of Professor O. V. Richardson, of Cambridge University, to a chair of physics at Princeton; Dr. H. L. Cooke, also of Cambridge University, has been called to an assistant professorship of physics.

Dr. C. D. Child, professor of physics at Colgate University, has been appointed to a similar chair in the School of Mining at Kingston, Ont.

Dr. A. Duncan Yokum has been appointed professor of pedagogy in the University of Pennsylvania, to succeed Dr. Martin G. Brumbaugh, who has become superintendent of the Philadelphia public schools.

At Brown University, Dr. Herbert E. Waters, of the University of Chicago, succeeds Dr. Leonard W. Williams as assistant professor of comparative anatomy.

Mr. E. H. Archbold has been appointed associate professor of chemistry in Syracuse University.

At Rochester University, Assistant Professor A. S. Gale has been promoted to a professorship of mathematics and Mr. Howard D. Minchin to an assistant professorship of physics.

Miss Mabel Chase has been promoted to be an associate professor of physics at Mount Holyoke College, and Miss Eleanor C. Doak has been appointed associate professor of mathematics.

Dr. Marion M. Hull has been elected professor of materia medica and therapeutics at the Atlanta School of Medicine, in succession to the late Dr. Charles D. Hurt.

Mr. James Muir, M.A., B.Sc., assistant to the professor of natural philosophy in Glasgow University, has been appointed to the chair of natural philosophy in the Glasgow and West of Scotland Technical College.

Dr. Wilhelm Wien, professor of physics at Würzburg, will succeed to the chair occupied by the late Professor O. Drude.